AMENDMENT

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently amended): A method of obtaining polynucleotide fragments for use in polynucleotide shuffling, comprising:

(a) obtaining a library of ~~homologous~~ mutant polynucleotides from a parental polynucleotide by mutagenesis;

(b) denaturing and hybridizing said mutant polynucleotides to form heteroduplex polynucleotides;

(c) cleaving said heteroduplex polynucleotides by using proteins of a polynucleotide repair system which cleave mismatched base pairs; and

(d) denaturing said cleaved heteroduplex polynucleotides to obtain said polynucleotide fragments.

2. (Canceled).

3. (Previously presented): The method of claim 1, wherein said method occurs *in vitro*.

4.–5. (Canceled).

6. (Previously presented): The method of claim 1, wherein said heteroduplex polynucleotide is generated from a native gene by successive directed mutagenesis, by error-prone PCR, by random chemical mutagenesis, or by *in vivo* random mutagenesis.

7. (Original): The method of claim 1, wherein said fragments are non-identical.

8. (Previously presented): The method of claim 1, wherein before exposing said heteroduplex polynucleotide to said polynucleotide repair system, promoting formation of said

heteroduplex polynucleotide by increasing the number of a parent polynucleotide in said library relative to other parent polynucleotides in said library.

9. (Previously presented): The method of claim 1, wherein before exposing said heteroduplex polynucleotide to said polynucleotide repair system, promoting formation of said heteroduplex polynucleotide by denaturing and rehybridizing the parent polynucleotides.

10. (Previously presented): The method of claim 1, wherein said polynucleotide repair system comprises mismatch repair enzyme, base excision repair enzyme, nucleotide excision repair enzyme, phage T4 endonuclease VII, phage T7 endonuclease I, or a combination of enzymes thereof.

11. (Previously presented): The method of claim 10, wherein said mismatch repair enzyme is DAM methylase, MutS, MutL, MutH, exonuclease, DNA helicase II, SSB protein, or a combination of enzymes thereof.

12. (Previously presented): The method of claim 10, wherein said base excision repair enzyme is DNA glycosylase, AP endonuclease, or a combination of enzymes thereof.

13. (Previously presented): The method of claim 10, wherein said nucleotide excision repair enzyme is Uvr-A, Uvr-B, Uvr-C, or a combination of enzymes thereof.

14. (Previously presented): The method of claim 1, wherein exposing said heteroduplex polynucleotide to said polynucleotide repair system comprises incubating said parental polynucleotide with phage T4 endonuclease VII, phage T7 endonuclease I, or a combination of enzymes thereof.

15. (Canceled).

16. (Previously presented): The method of claim 1, wherein before exposing said heteroduplex polynucleotide to said polynucleotide repair system, introducing at least one mismatch per parent polynucleotide.

17. (Previously presented): The method of claim 1, wherein at least one strand of the parent polynucleotides is methylated.

18. (Original): The method of claim 1, wherein said heteroduplex polynucleotide comprises dITP or uracil-containing DNA.

19. (Original): The method of claim 1, wherein said heteroduplex polynucleotide comprises heteroduplex between DNA and RNA.

20. (Canceled).

21. (Previously presented): The method of claim 1, wherein said polynucleotide repair system partially digests and partially cleaves mismatches.

22. (Previously presented): The method of claim 1, wherein at least one damaged base is introduced per parental polynucleotide.

23. (Previously presented): The method of claim 1, wherein at least one damaged nucleotide is introduced per parental polynucleotide.

24.-27. (Canceled).